

NOTICE

All drawings located at the end of the document.

CORRES CONTROL
OUTGOING LTR NO

DOE ORDER #

04 RF 00605



04-RF-00605

June 2, 2004

DIST	LTR	ENC
Berardini, Jacqueline	X	
BRILSFORD, M D		
FERRERA, D W	X	
FERRI, M S		
FULTON, J C		
GIACOMINI, J		
HALL, L		
MARTINEZ, L A		
PARKER, A M		
POWERS, K		
SCOTT, G K		
SHELTON, D C	X	
SPEARS, M S		
TRICE, K D		
VOORHEIS, G M		
BUTLER, J L	X	X
THORNBURG, AMY	X	

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TRANSMITTAL OF THE DRAFT NFAA JUSTIFICATION FOR PAC 000-190 –
JLB-049-04

Enclosed are copies of the Draft NFAA Justification for PAC 000-190 We will contact
your staff to schedule a meeting the week of June 14, to resolve comments and finalize
the text

If you have any questions, please contact me at extension 5245


J Lane Butler
Manager, Environmental Restoration Programs

JLB dm

AUTHORIZED CLASSIFIER
SIGNATURE
Exemption – CEX-105-01

Date

Orig and 1 cc – Joseph Legare
cc Norma Castaneda

IN REPLY TO RFP CC
NO

Enclosures
As Stated

ACTION ITEM STATUS

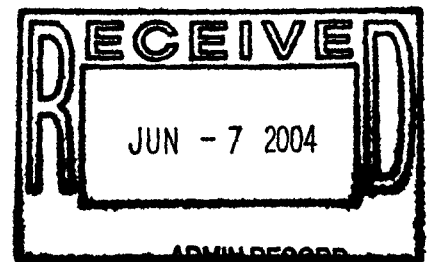
- ☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS

ORIG & TYPIST INITIALS

Revision 8/03

Kaiser-Hill Company, L L C
Rocky Flats Environmental Technology Site, 10808 Hwy 93 Unit B, Golden, CO 80403-8200 • 303-966-7000



IA-A-002154

NO FURTHER ACCELERATED ACTION JUSTIFICATION FOR CAUSTIC LEAK

PAC REFERENCE NUMBER: 000-190

IHSS Number	190
Operable Unit	IA
IHSS Group	000-3
Unit Name	Caustic Leak
Approximate Location	N749,000, E2,082,000 - Steam plant (Building 443) catch basin to Pond B-1 via Central Avenue ditch and South Walnut Creek

Date(s) of Operation or Occurrence

December 3 and 4, 1978 and January 6, 1989

Description of Operation or Occurrence

On December 3 and 4, 1978 a bulk caustic storage tank leaked into its spill catch basin. Due to operator error, a sodium hydroxide (NaOH) solution was subsequently released from the catch basin to the Central Avenue Ditch. The sodium hydroxide solution flowed eastward down the Central Avenue Ditch and was diverted to South Walnut Creek and Pond B-1 for temporary containment (DOE 1992). Figure 1 shows the location of IHSS 000-190.

On January 6, 1989, caustic solution was released from the same Building 443 tank involved in the December 1978 incident, into its secondary containment (spill catch basin). The outlet pipe and valve on the tank deteriorated to the extent that the pipe disconnected from the tank. Due to cold weather, the caustic froze which prevented further leakage (DOE 1992).

Physical/Chemical Description of Constituents Released

The December 1978, incident involved about 1,000 to 1,500 gallons of caustic solution that was composed of 12.5 Normal NaOH (sodium hydroxide) also expressed as 50 percent NaOH. This is generically referred to as concentrated sodium hydroxide. The January 1989 incident involved about one to three gallons of concentrated caustic solution (DOE 1992).

Responses to Operation or Occurrence

In response to the December 1978 incident, immediate steps were taken to isolate the contamination, treat the contaminated runoff, and divert drainage from adjacent areas. These steps included the following (DOE 1992)

- Divert the 400 area snow melt water across Central Avenue Ditch to the 700 area drainage,
- Dam the upper Central Avenue Ditch above the B-Series ponds near the cattle fence,
- Divert Building 995 sewage effluent to Pond 207B-South and retain Pond B-3 as a reserve pond,
- Rope off the upper portion of the Central Avenue Ditch,
- Pump Pond B-2 to Pond A-2 and hold Pond B-2 as a last resort catch pond, and,
- Neutralize Pond B-1 by adding 1,400 pounds of alum and then pump this liquid to Pond 207B-North

Follow-up response activities to the December 1978 incident included (DOE 1992)

- Neutralize the Central Avenue Ditch water between Fifth and Tenth Streets by adding 5,000 pounds of alum,
- Complete final sampling of Pond 207B-North on about January 19, 1978,
- Monitor the pH of the ditch. On March 23, 1979, the ditch was considered to be no longer a problem and runoff from ditch was allowed to be discharged offsite,
- On about May 4, 1979, Pond 207B-North liquid was drained into Pond B-2, and,
- On about June 29, 1979, the remaining liquid in Pond B-1 was declared environmentally acceptable and sprayed on the adjacent hillside

The tank leak was identified and all repairs were completed. Furthermore, the incident was reviewed with all Stationary Operating Engineers at the Central Steam Plant and they were directed to review all standard operating procedures on chemical handling and storage. An incident report was prepared (DOE 1992)

In response to the January 1989 incident, the tank was temporarily repaired and emptied. The removed caustic was neutralized and transferred to Building 374 for treatment as a process waste (DOE 1992)

Fate of Constituents Released to Environment

IHSS 000-190 has been sampled in many locations as part of investigations of other neighboring IHSSs. Figure 2 shows these sample locations. As discussed below, only a subset of the data from these locations are used in the justification for No Further Accelerated Action (NFAA) for IHSS 000-190.

PROPOSED REVISION OF THE IHSS BOUNDARY

The current boundary of IHSS 000-190 is the Central Avenue ditch from the steam plant (Building 443) to South Walnut Creek and Pond B-1 (see Figure 1). As shown in Figure 2, some IHSSs overlap or are directly adjacent to IHSS 000-190. From west to east, these IHSSs are 400-129 (IHSS Group 400-7), 400-157 1 (IHSS Group 400-7), 400-802 (IHSS

Group 600-2), 600-1004 (IHSS Group 600-5), 800-164 3 (IHSS Group 800-6), 900-153 (IHSS Group 900-2), and 900-113 The status of these IHSS Groups/IHSSs is as follows

- IHSS Group 400-7 is still under investigation/accelerated action pursuant to the IASAP Addendum #IA-02-05 (DOE 2002a) and the ER RSOP Notification #02-06 for IHSS Group 400-7 (DOE 2002b),
- IHSS Group 600-2 has an approved NFAA (DOE 2003a) (CDPHE 2003a),
- IHSS Group 600-5 will be investigated in the future,
- IHSS Group 800-6 has an approved NFAA (DOE 2003b) (CDPHE 2003b)
- IHSS Group 900-2 has a Data Summary Report in preparation, and
- IHSS 900-113 (the Mound Site) was remediated pursuant to a Proposed Action Memorandum (PAM) (DOE 1997)

It is proposed that IHSS 000-190 not include those ditch sections where the above noted IHSSs overlap or are adjacent to the ditch The data for the sampling locations in IHSS 000-190 that are associated with the neighboring IHSSs have been or will be used to make an accelerated action determination or to justify an NFAA for the neighboring IHSSs It is proposed that these ditch sections and associated sampling locations be removed from IHSS 000-190 The revised IHSS 000-190 boundary is depicted on Figure 2 The revised IHSS consists of three reaches of the Central Avenue Ditch, the first reach is from the east end of PAC 600-1004 to the west end of IHSS 800-164 3, the second reach is from the east end of IHSS 800-164 3 to the west end of IHSS 900-153, and the third reach is from the east end of IHSS 900-113 to Pond B-1 (includes a portion of South Walnut Creek just above Pond B-1)

CHARACTERIZATION SUMMARY

The sample density for characterizing IHSS 000-190 (as revised) is highest at its east end, and tapers off just west of IHSS 900-153 (see Figure 2) There is a lack of sample locations in IHSS 000-190 (as revised) due west and east of IHSS 800-164 3 Nevertheless, the characterization of IHSS 000-190 is adequate for the following reasons

- The Central Avenue Ditch soil contaminant characteristics at IHSS 800-164 3 are expected to be representative of soil just west (upstream) of this location IHSS 800-164 3 has an approved NFAA Concentrations of constituents in the Central Avenue Ditch soil at this location are well below the WRW ALs (DOE 2003b)
- Immediately downstream of IHSS 800-164 3 (to the east), there are swales discharging from the south that originate from the former Building 865 (surface water stations GS28 and GS43 [see Figure 3]) The former Building 865 is part of IHSS Group 800-1, which has an approved NFAA Furthermore, this discharge would ultimately pass through the downstream section of the Central Avenue Ditch, which has been characterized, and is discussed herein

Table 1 summarizes the sample analysis activities at IHSS 000-190 based on current available data collected at locations within the revised boundary shown on Figure 2 As

can be seen in Table 1, most surface soil and subsurface soil samples were analyzed for metals, radionuclides, VOCs, SVOCs, pesticides, and PCBs

The surface and subsurface soil data are summarized in Tables 2 and 3, respectively. These tables show analytes that were detected above background (see discussion below). In these tables, the following decision rules were applied to the calculation of summary statistics:

- 1 Data rejected during validation was eliminated from the data set before computing statistics
- 2 The maximum value is the highest detected value observed
- 3 The average was computed using only data that are above background concentrations

Figures 4 and 5 show, for surface and subsurface soil, respectively, all the data that were detected above background, and that have a RFCA Wildlife Refuge Worker (WRW) Action Level. The ALs are from RFCA Attachment 5, dated June 5, 2003 (DOE, CDPHE, EPA 2003). Background levels for inorganic constituents for subsurface soil are from the Background Geochemical Characterization Report (DOE 1993). Background values for surface soils are from Geochemical Characterization of Background Surface Soils Background Soils Characterization Program (DOE 1995). All background values used for comparison are the mean background value plus two standard deviations. Any detection of an organic compound is considered an above background level observation.

SURFACE SOIL ASSESSMENT

As shown in Table 2 and Figure 4, surface soil at IHSS 000-190 contains above background radionuclides (plutonium-239, americium-241, uranium-234, uranium-235, and uranium-238), several metals, and the xylene and fluoranthene. However, concentrations are well below the WRW ALs.

APPLICATION OF THE SUBSURFACE SOIL RISK SCREEN

Screen 1 – Are Contaminant of Concern (COC) Concentrations Below Table 3 Wildlife Refuge Worker (WRW) Soil Action Levels?

Yes. Although several organics and radionuclide concentrations were above background, the concentrations do not exceed the WRW ALs (see Table 3 and Figure 5). In accordance with Figure 3 of RFCA Attachment 5, Screen 4 is performed next given a “yes” response to Screen 1.

Screen 4 – Is there an environmental pathway and sufficient quantity of COC that would cause exceedance of surface water standards (SWS)?

No. Erosion is the most significant and obvious pathway whereby surface water could become contaminated by subsurface (and surface) soil contaminants. Although IHSS 000-190 is not in a high erosion area as defined by Figure 1 of RFCA Attachment 5 (DOE, CDPHE, EPA 2003), it is a drainage and is subject to erosion, particularly during

high flow events. The water quality data for surface water station SW022 (Table 4), located at the eastern end of IHSS 000-190 (see Figure 3), shows there are plutonium-239/240, americium-241, and metals that exceed the surface water ALs (DOE, CDPHE, EPA 2003). However, this is largely a result of the Central Avenue Ditch collecting runoff from the southern portion of the Industrial Area (including a portion of the 903 Pad where above background levels of radionuclides, metals, and organics in surface soil is common). The Central Avenue Ditch represents a small area relative to the area drained by the ditch. Also, the soil in the Central Avenue Ditch is not uniquely contaminated relative to the surrounding soil in the Industrial Area. It is worthy of note that nearby IHSS Groups 900-3 (904 Pad), 800-4 (UBC 886), and 800-1 (UBC 865), where runoff drains to the Central Avenue Ditch, all have approved NFAAs and did not require removal of soil because soil constituent concentrations were below the WRW ALs.

SW022 is also not a Point of Compliance (POC) in accordance with Attachment 5 of RFCA (DOE, CDPHE, EPA 2003), and therefore, the water quality data at this station is used strictly for assessment of runoff water quality within the Industrial Area. Compliance with the surface water action levels has always been achieved at the POCs downstream of the Central Avenue Ditch, Pond B-5 discharge (GS08), and further downgradient where Walnut Creek crosses Indiana Street (GS03).

NFAA Summary

IHSS 000-190 is proposed for NFAA. The boundary of the IHSS has been revised to not include those ditch sections where IHSSs overlap or are adjacent to the ditch because data for the ditch soil at these locations has been or will be used to make an accelerated action determination or justify an NFAA for the neighboring IHSSs. Within the revised IHSS 000-190 boundary, constituent concentrations in both surface and subsurface soil are well below the WRW ALs. Application of the Subsurface Soil Risk Screen from RFCA Attachment 5 also indicates no significant potential to impact surface water quality. Surface water quality is impacted at surface water station SW22, located at the distal end of the IHSS. However, this is largely a result of the Central Avenue Ditch collecting runoff from the southern portion of the Industrial Area (including a portion of the 903 Pad where above background levels of radionuclides, metals, and organics in surface soil are common). The soil in the Central Avenue Ditch is not uniquely contaminated relative to the surrounding soil in the Industrial Area. The Central Avenue Ditch also represents a small area relative to the area drained by the ditch. Compliance with the surface water action levels has always been achieved at the POCs downstream of the Central Avenue Ditch. Lastly, the release that rendered the ditch an IHSS was a caustic spill which raised the pH of the water. The documentation shows the water was adequately neutralized with alum shortly after the spill event. Therefore, it is concluded that no further accelerated action is required at IHSS 000-190.

References

CDPHE, 2003a Correspondence to R DiSalvo, DOE RFO, from S Gunderson, CDPHE, RE Final Closeout Report for IHSS Group 600-2, June 19

CDPHE, 2003b Correspondence to R DiSalvo, DOE RFO, from S Gunderson, CDPHE, RE Final Closeout Report for IHSS Group 800-6, March 25

DOE, 1992, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, CO, August

DOE, 1993, Background Geochemical Characterization Report, Golden, CO, September

DOE, 1995 Geochemical Characterization of Background Surface Soils Background Soils Characterization Program, Golden, CO, May

DOE, 1997 Closeout Report for the Source Removal at the Mound Site IHSS 113, Rocky Flats Environmental Technology Site, Golden, Colorado, October

DOE, 2002a, Industrial Area Sampling and Analysis Plan Addendum #IA-02-05, IHSS Group 400-7, Rocky Flats Environmental Technology Site, Golden, Colorado, April

DOE, 2002b, ER RSOP Notification IHSS Group 400-7, Notification #02-06, Rocky Flats Environmental Technology, May

DOE, 2003a, Final Closeout Report for IHSS Group 600-2, PAC 400-802, Storage Shed South of Building 334, Rocky Flats Environmental Technology Site, June

DOE, 2003b, Final Closeout Report for IHSS Group 800-6, Rocky Flats Environmental Technology Site, March

DOE, 2004, Final Closeout Report for IHSS Group 800-1, Rocky Flats Environmental Technology Site, March

DOE, CDPHE, EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment 5, U S Department of Energy, Colorado Department of Public Health and Environment, and U S Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June

Table 1 Central Avenue Ditch Analytical Program

Location Code	Sample Type	Analyte Class					
		Rads	Metals	PCBs	Pesticides	SVOCs	VOCs
13070299	Surface Soil	X	X	X	X	X	X
13110199	Surface Soil	X	X	X	X	X	X
13110299	Surface Soil	X	X	X	X	X	X
13110399	Surface Soil	X	X	X	X	X	X
13110499	Surface Soil	X	X	X	X	X	X
CM39-012	Surface Soil	X	X				X
CP40-009	Surface Soil	X	X				
SS308393	Surface Soil	X	X				
SS609892	Surface Soil	X	X	X	X		
SS609992	Surface Soil	X	X	X	X		
SS613092	Surface Soil	X	X	X	X		
SS613192	Surface Soil	X	X	X	X		
SS613292	Surface Soil	X	X	X	X		
SS614092	Surface Soil	X	X	X	X		
SS614192	Surface Soil	X	X	X	X		
SS614892	Surface Soil	X	X	X	X		
SS614992	Surface Soil	X	X	X	X		
13070299	Subsurface Soil	X	X	X	X	X	X
13070399	Subsurface Soil	X	X	X	X	X	X
13110199	Subsurface Soil	X	X	X	X	X	X
13110299	Subsurface Soil	X	X	X	X	X	X
13110399	Subsurface Soil	X	X	X	X	X	X
13110499	Subsurface Soil	X	X	X	X	X	X
SS10199	Subsurface Soil	X	X				
SS10399	Subsurface Soil	X	X				
SS10499	Subsurface Soil	X	X				
00893	Subsurface Soil		X				X
02491	Subsurface Soil						X

Table 2 Summary of Constituents Above Background in Central Avenue Ditch Surface Soil

Constituent	Sample Number	Detection Limit	Concentration	Background	Excess	Unit
Americium-241	12	91.7%	0.70	1.63	0.02	pCi/g
Antimony	16	18.8%	15.90	19.10	0.47	mg/kg
Barium	16	50.0%	219.88	574.00	141.26	mg/kg
Chromium	16	6.3%	21.40	21.40	16.99	mg/kg
Cobalt	16	18.8%	13.87	18.80	10.91	mg/kg
Copper	16	56.3%	54.52	268.00	18.06	mg/kg
Fluoranthene	5	20.0%	690.00	690.00	-	ug/kg
Iron	16	18.8%	24500.00	34600.00	18037.00	mg/kg
Lead	16	6.3%	56.60	56.60	54.62	mg/kg
Manganese	16	18.8%	581.00	815.00	365.08	mg/kg
Nickel	16	25.0%	24.93	48.60	14.91	mg/kg
Plutonium-239/240	15	100.0%	1.15	8.51	0.07	pCi/g
Strontium	16	56.3%	86.54	310.00	48.94	mg/kg
Uranium, Total	12	8.3%	9.52	9.52	5.98	mg/kg
Uranium-234	15	6.7%	3.21	3.21	2.25	pCi/g
Uranium-235	16	6.3%	0.20	0.20	0.09	pCi/g
Uranium-238	16	6.3%	3.21	3.21	2.00	pCi/g
Vanadium	16	6.3%	75.50	75.50	45.59	mg/kg
Xylene	2	50.0%	3.00	3.00	-	ug/kg
Zinc	16	62.5%	107.36	167.00	73.76	mg/kg
Exceeds Wildlife Refuge Worker Action Level						

Table 3 Summary of Constituents Above Background in Central Avenue Ditch Subsurface Soil

Analyte	Sample Number	Detector Frequency (MHz)	Average Concentration (ppm)	Background Concentration (ppm)	Maximum Concentration (ppm)	Unit
1,2-Dichloroethene (total)	6	16.7%	32.00	32.00	-	ug/kg
2-Butanone	21	9.5%	150.00	200.00	-	ug/kg
Americium-241	15	53.3%	1.49	7.02	0.02	pCi/g
Benzo(k)fluoranthene	9	22.2%	450.00	470.00	-	ug/kg
Cobalt	15	6.7%	32.30	32.30	29.04	mg/kg
Endrin	9	11.1%	12.00	12.00	-	ug/kg
Fluoranthene	9	22.2%	1100.00	1100.00	-	ug/kg
gamma-BHC	9	11.1%	10.00	10.00	-	ug/kg
Methylene chloride	19	26.3%	8.20	10.00	-	ug/kg
Plutonium-239/240	15	60.0%	2.06	8.34	0.02	pCi/g
Pyrene	9	22.2%	1025.00	1100.00	-	ug/kg
Toluene	23	17.4%	279.50	990.00	-	ug/kg
Trichloroethene	24	4.2%	110.00	110.00	-	ug/kg
Uranium-238	15	13.3%	2.86	4.13	1.49	pCi/g
Exceeds Wildlife Refuge Worker Action Level						

Table 4 Station GS-22 Surface Water Quality Summary

ANALYTE	# of Samples	Mean	Min	Max	# of Samples > SW AL	SW AL	Unit
AMERICIUM-241	71	0.08	0	1.76	6	0.15	pCi/l
PLUTONIUM-239/240	70	0.41	0	9.49	19	0.15	pCi/l
URANIUM-233,-234	71	0.50	0.022	1.75	NA	NA	pCi/l
URANIUM-235	71	0.03	0	0.187	NA	NA	pCi/l
URANIUM-238	71	0.63	0.039	2.601	NA	NA	pCi/l
Tot U	71	1.16	0.061	3.913	0	10	pCi/l
Hardness as CaCO3 mg/L	5	68.00	24	170	NA	NA	ug/l
ALUMINUM	26	5345.00	262	47300	NA	NA	ug/l
ANTIMONY	26	18.75	0.92	55.7	21	6	ug/l
ARSENIC	26	2.78	0.92	15.2	26	0.018	ug/l
BARIUM	26	71.46	28.8	295	0	490	ug/l
BERYLLIUM	25	0.31	0.01	2.9	0	4	ug/l
CADMIUM	26	0.27	0.04	0.72	NA	NA	ug/l
CALCIUM	26	21940.77	7360	39500	NA	NA	ug/l
CHROMIUM	26	6.62	0.41	44.3	0	50	ug/l
COBALT	26	1.76	0.1	12	NA	NA	ug/l
COPPER	25	11.17	4.7	35.6	NA	NA	ug/l
IRON	26	4813.38	228	40200	NA	NA	ug/l
LEAD	25	7.36	0.78	31.1	NA	NA	ug/l
LITHIUM	26	11.85	2.1	122	NA	NA	ug/l
MAGNESIUM	26	4366.15	1460	9370	NA	NA	ug/l
MANGANESE	26	95.32	7.5	844	NA	NA	ug/l
MERCURY	25	0.06	0.05	0.13	25	0.01	ug/l
MOLYBDENUM	26	1.11	0.11	2.4	NA	NA	ug/l
NICKEL	26	5.20	0.81	33.9	NA	NA	ug/l
POTASSIUM	26	4619.23	2210	11800	NA	NA	ug/l
SELENIUM	26	0.60	0.1	1.8	0	4.6	ug/l
SILICON	5	4612.00	1530	8340	NA	NA	ug/l
SILVER	26	0.18	0.025	0.59	NA	NA	ug/l
SODIUM	26	31484.62	6040	245000	NA	NA	ug/l
STRONTIUM	26	126.75	33.8	286	NA	NA	ug/l
THALLIUM	26	0.54	0.075	2.2	10	0.5	ug/l
TIN	25	0.60	0.24	1.5	NA	NA	ug/l
VANADIUM	26	12.50	1.9	86.9	NA	NA	ug/l
ZINC	26	90.83	27.1	205	NA	NA	ug/l
Exceeds the Surface Water Action Level (SW AL)							

Figure 3 Central Avenue Ditch Drainage Basin

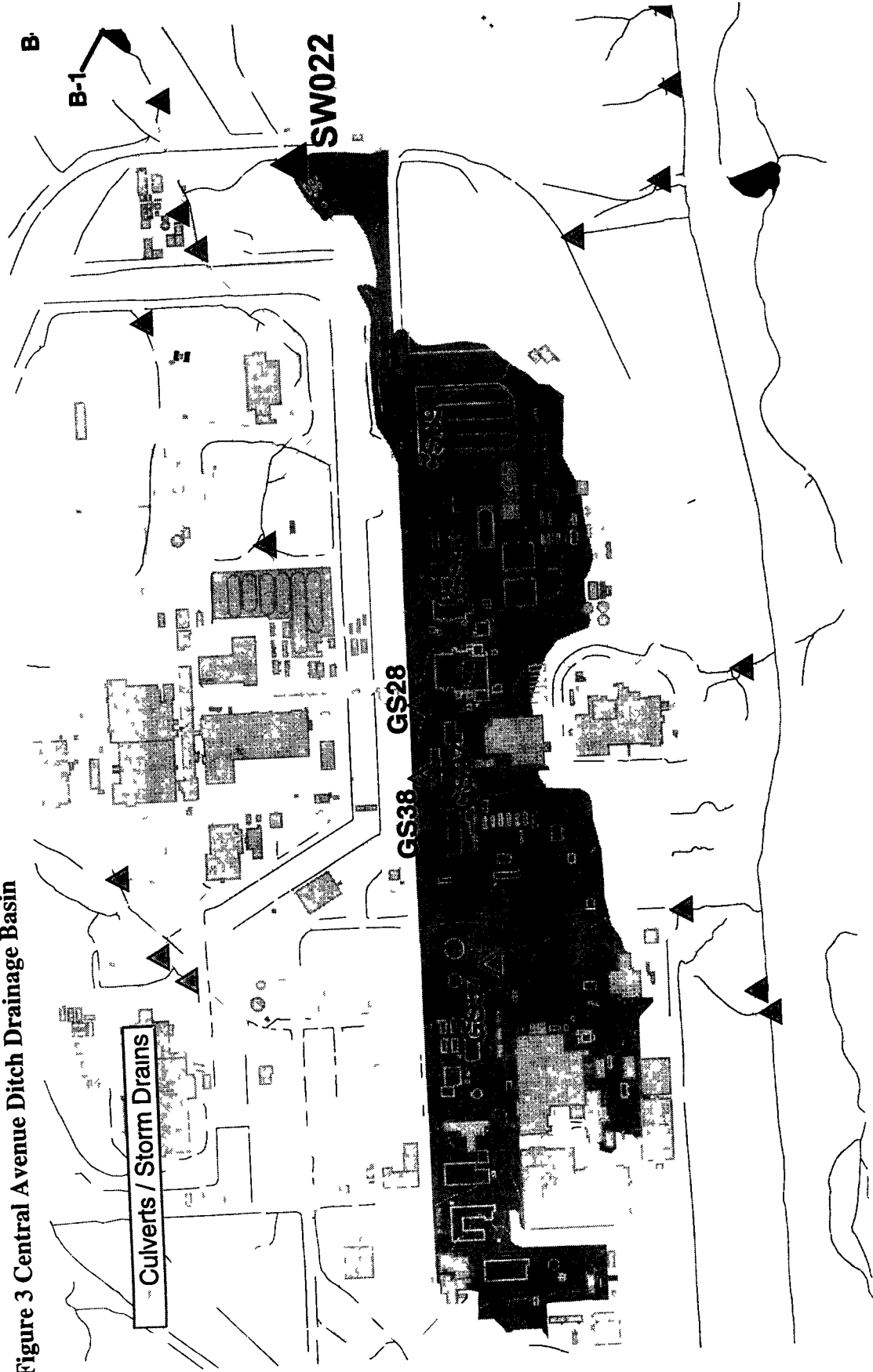


Figure 1
IHSS 000-190
Location Map

KEY

- IHSS
- Fence
- Storm Drain
- OPWL
- Dirt Road
- Stream
- Lake
- Structure
 - Demolished
 - Standing
- Paved Road

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Scale 1:7,000
0 500 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by _____ Date April 2004

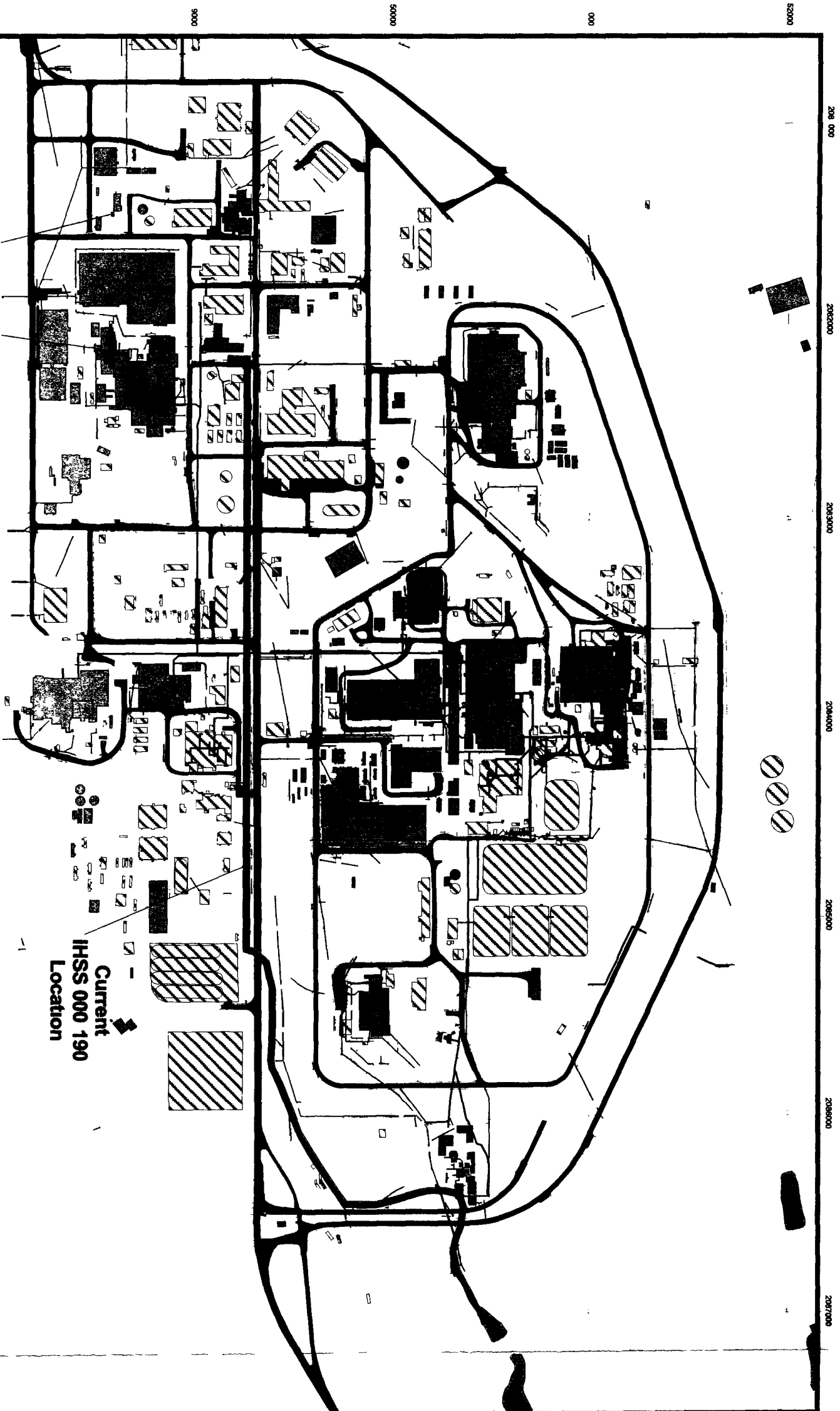
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